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PATENT**CLAIMS:**

1-12. (cancelled)

13. (Currently amended) A transistor comprising three conductive segments of DNA molecules connected to an active core, wherein the active core comprises a fourth DNA segment

wherein a pair first and a second of said three conductive segments are linked to said active core via phosphorus bridges ("P-bridges"), P-bridges, wherein a third of said conductive segments is capacitively linked to said active core via hydrogen bonds ("H-bonds"), H-bonds, and wherein said third segment is configured to electrically modulate current flowing across said active core through said P-bridges between said pair first and second of said three conductive segments in response to a gate voltage applied to said third conductive segment.

14. (Previously Presented) The transistor of claim 13, wherein the conductive segments of DNA molecules are M-DNA conductive strands.

15. (Previously Presented) The transistor of claim 13, wherein the conductive segments of DNA molecules are Poly-G Poly-C DNA conductive strands.

16. (Previously Presented) The transistor of claim 13, wherein a hopping mechanism across a tunnel junction is employed for electron transfer between the pair of conductive segments and said active core.

17. (Previously Presented) The transistor of claim 16, wherein said hopping mechanism comprises using a P-bridge as the tunnel junction.

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18-29 (Cancelled).

30. (Previously Presented) A DNA-based electronic device, comprising:

a length of a DNA molecule; and

a gate structure disposed adjacent to the length of the DNA molecule;

wherein the gate structure is capacitively coupled to the length of the DNA molecule, whereby electric charge in the length of the DNA molecule can be controlled by application of a voltage or current to the gate structure.

31. (Previously Presented) The electronic device of claim 30 wherein the length of the DNA molecule comprises one strand of the pair of complementary strands defining the DNA molecule structure.

32. (Previously Presented) The electronic device of claim 30 wherein the length of the DNA molecule comprises a double strand DNA molecule segment.

33. (Previously Presented) The electronic device of claim 30, wherein the electric charge in the length of the DNA molecule is provided via source and drain contacts that are disposed on the length of the DNA molecule.

34. (Previously Presented) The electronic device of claim 30, wherein the source and drain contacts comprise a complex of metal ions and DNA molecules (M-DNA).

35. (Previously Presented) The electronic device of claim 30, wherein the source and drain contacts comprise Poly-G Poly-C type DNA materials.

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36. (Previously Presented) The electronic device of claim 30 which is further disposed in an electronic logic circuit.